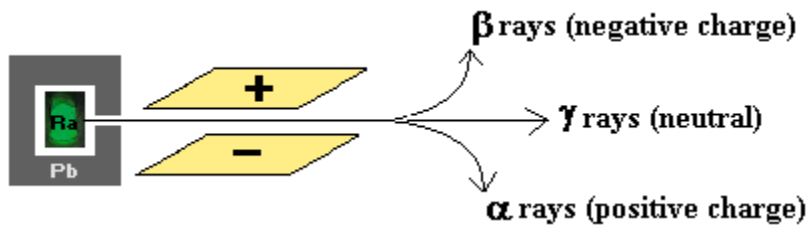


## Section 4.4: Unstable Nuclei and Radioactive Decay

### What are the three types of radiation? How can you describe them?

*You now have an understanding of the structure of the atom. The nucleus, containing protons and neutrons, is surrounded by electrons traveling through a large volume of empty space. This section introduces you to some of the changes that can take place in the nucleus of the atom.*

#### Model 1: Types of Radiation

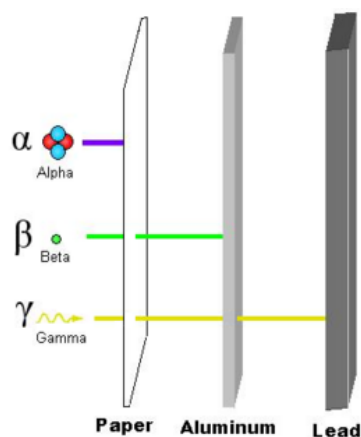


**Group Instructions:** When addressing each question, one group member should be assigned the task of reading the question aloud for the rest of the group. The manager should rotate that role among group members throughout the assignment.

#### Questions:

- 1) What element is contained inside the box in Model 1 above? \_\_\_\_\_
- 2) How did they know that the beta ( $\beta$ ) ray or particle was negative? \_\_\_\_\_
- 3) How did they know that the alpha ( $\alpha$ ) ray or particle was positive? \_\_\_\_\_
- 4) How did they know that the gamma ( $\gamma$ ) ray was neutral? \_\_\_\_\_
- 5) Which particle do you think is described as:
  - a. Fast energy electron \_\_\_\_\_
  - b. High energy (having no mass or charge) \_\_\_\_\_
  - c. Two protons + two neutrons (helium nucleus) \_\_\_\_\_
- 6) What do you think *radioactive decay* means? \_\_\_\_\_

## Model 2: Types of Radiation – Penetrating Power



- 7) Which particle would be easiest to protect yourself against? Why?
- 8) Which particle do you think does the most damage to the human body? Why?
- 9) Complete the following table:

PARTICLE	SYMBOL	MASS	CHARGE
Alpha			
Beta			
Gamma			

- 10) What do you think it means for an atom to undergo *alpha decay*?
- 11) What do you think it means for an atom to undergo *beta decay*?
- 12) Which type(s) of subatomic particles are involved in:
- Nuclear reactions \_\_\_\_\_
  - Chemical reactions \_\_\_\_\_